

**EAST ROSEMARY STREET
TOWN PARKING DECK REDEVELOPMENT**

TRAFFIC IMPACT STUDY - *DRAFT*

EXECUTIVE SUMMARY



Prepared for:

The Town of Chapel Hill
Public Works Department - Engineering

Prepared by:

HNTB North Carolina, PC

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Raleigh, NC 27609*

NCBELS License #: C-1554

April 2020



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Project Overview

A new office building and parking deck are being proposed as a combined redevelopment project along E. Rosemary Street, just east of its intersection with NC 86 (N. Columbia Street) in Chapel Hill, NC. Based on traffic impact study scoping discussions with Town of Chapel Hill staff and the Applicant, there will be two separate traffic impact studies conducted for this project. This report contains the initial study of the impacts of the proposed 1,100 space parking deck. A second report will detail the impacts of the proposed office building development after the new parking deck is complete. The overall project proposes to replace the current Town-owned Wallace Parking Deck with a 200,000 square foot office building and to create a new parking deck (with 1,100 spaces) where the existing Rosemary Deck (and adjacent private surface parking lot) are located, just east of PNC Bank. **Figure ES-1** shows the general location of the site. The project is anticipated to be completed in two stages – with the new Parking Deck constructed by 2021 and the office building by 2022. This report analyzes the full build-out scenario for the year 2022 (one year after full build-out of the new parking deck), the no-build scenario for 2022, as well as 2020 existing year traffic conditions.

The proposed site concept plan shows a provision for two full movement access driveways that connect the new parking deck to E. Rosemary Street. Additionally, the concept plan displays a potential parking deck access point onto NC 86 (N. Columbia Street). Additional access could be accommodated along North Street and consideration for this was also included in this study. **Figure ES-2** displays the initial preliminary concept plan of the new Rosemary Parking Deck. The proposed office building and parking deck would likely increase parking availability for the E. Rosemary Street parking deck, surface lot, and Wallace Parking Deck from approximately 850 existing parking spaces to 1,100 parking spaces. This report analyzes and presents the transportation impacts that the parking deck redevelopment will have on the following intersections in the project study area:

- W. Rosemary Street and Church Street
- W. Rosemary Street and NC 86 (N. Columbia Street)
- E. Rosemary Street and Henderson Street
- E. Rosemary Street and Hillsborough Street
- SR 1010 (W. Franklin Street) and Church Street
- SR 1010 (Franklin Street) and NC 86 (Columbia Street)
- SR 1010 (E. Franklin Street) and Henderson Street
- SR 1010 (E. Franklin Street) and Hillsborough Street / Raleigh Street
- NC 86 (N. Columbia Street / MLK Jr. Boulevard) and N. Columbia Street / North Street
- NC 86 (MLK Jr. Boulevard) and Longview Street / Mill Creek Condominiums
- W. Cameron Avenue and NC 86 SB (Pittsboro Street)
- Cameron Avenue and NC 86 (S. Columbia Street)
- E. Cameron Avenue / Country Club Road and Raleigh Street

The impacts of the proposed site at the study area intersections were evaluated during the AM, noon, and PM peak hours of an average weekday. Additional existing and future parking deck driveway locations were also analyzed as part of the study.

Existing Conditions

The site is located in downtown Chapel Hill along E. Rosemary Street east of the NC 86 corridor. The study area contains 12 signalized intersections in the downtown area. All future site traffic is expected use access points along E. Rosemary Street, or potentially NC 86 (N. Columbia Street) or North Street. The NC 86 and Franklin Street corridors are major arterials providing both regional and local access.



Rosemary Street is a minor arterial/collector street that provides connectivity throughout the downtown and into Carrboro. Remaining study area network roadways are local neighborhood / commercial / institutional access streets. The downtown/UNC Main Campus area features moderate/high traffic activity throughout the day, as well as high levels of pedestrian, bicycle and transit activity.

Site Traffic Generation

With the addition of new peak hour trips during the weekday AM, noon, and PM peak hours, there are potential site traffic impacts to the study area intersections. **Table ES-1** shows the site trip generation details, with generation rates taken from field collected data at the existing parking facility access points along E. Rosemary Street and the projected growth ratio of peak hour activity based on the increased in parking supply offered by the new deck compared to existing conditions.

Table ES-1. Weekday Vehicle Trip Generation Summary

Facility	Units	Daily Estimate			AM Peak Hour			Noon Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total
Existing Parking Trips (Reallocated to new deck)	700 spaces	1365	1365	2730	183	16	199	142	108	250	72	198	270
Proposed Lot Ratio (1100 / 842) – “Net” New Trips	0.235	321	321	643	43	4	47	33	25	58	17	47	64
Total Trips To/From New Deck		1686	1686	3373	226	20	246	175	133	308	89	245	334

Background Traffic

Background traffic growth for the 2022 analysis year is expected to come from two sources - ambient regional traffic growth and specific development-related traffic growth. Historic growth patterns do not indicate sustained growth in the project study area, however a number of development projects are occurring or are expected to occur outside the project study area which may contribute to future area-wide traffic growth. To conservatively account for this potential, a 1.0 percent per year ambient growth rate was applied to 202 traffic volumes to estimate 2022 background traffic on study area roadways. One specific development, Union Chapel Hill Apartments, set to open in fall 2020 was included as a specific background development traffic generator.

Impact Analysis

Peak Hour Intersection Level of Service

Existing 2020 traffic operations at all study area intersections are acceptable during all three peak hours analyzed, except for the westbound stop-controlled approach at the NC 86 intersection with North Street/N. Columbia Street in the PM peak hour. Projected ambient and background development traffic growth and planned transportation projects will increase impacts at many study area locations by 2022, but will only cause one other intersection to operate at deficient levels in any peak hour. The Franklin Street/NC 86 (N. Columbia Street) intersection will drop from a LOS D to LOS E in the 2022 PM peak hour. With the addition of peak hour site-generated trips to the projected 2022 background traffic volumes, no additional study area intersections are expected to experience deficient traffic operations in any peak hour. The effect of site traffic is a “net” increase across the study area network that causes minor variations in traffic operational results. The proposed modified access scenario produces beneficial operational results at the NC 86/Rosemary Street intersection. A summary of the traffic operations for each intersection, related to vehicular delays (intersection average as a whole if signalized, critical movement if stop-controlled) and the corresponding Level-of-Service (LOS) is shown in **Table ES-2** on the following page.



Table ES-2. Peak Hour Intersection Capacity Analysis Summary

Intersections	Peak Hour	2020 Existing		2022 No-Build		2022 Build		2022 Build – Modified Access	
		LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
W. Rosemary Street & Church Street	AM	B	11.3	A	9.2	A	9.2		
	NOON	B	10.8	A	9.5	A	9.5		
	PM	B	15.8	B	13.9	B	13.9		
W. Rosemary Street & NC 86	AM	C	25.4	C	26.6	C	26.6	C	26.5
	NOON	C	32.4	C	29.6	C	31.8	C	29.3
	PM	C	34.6	D	35.9	D	46.5	D	36.1
E. Rosemary Street & Henderson Street	AM	A	8.0	A	8.6	A	9.1	No change to projected traffic volumes – Little to Marginal Change in Operations Expected Compared to the 2022 Build – Original Access Scenario	
	NOON	B	12.7	B	12.4	B	11.9		
	PM	B	13.4	B	11.3	B	11.1		
E. Rosemary Street & Hillsborough Street	AM	B	14.8	B	15.0	B	14.9		
	NOON	B	18.9	B	15.5	B	15.4		
	PM	B	17.5	B	17.4	B	17.7		
W. Franklin Street & Church Street	AM	A	6.4	A	7.8	A	7.7		
	NOON	B	10.7	B	11.8	B	12.6		
	PM	B	15.0	B	18.3	B	18.4		
Cameron Ave/Country Club Rd & Raleigh Street	AM	C	22.8	C	23.7	C	23.3		
	NOON	C	20.4	C	21.0	C	20.8		
	PM	C	29.6	C	30.7	C	30.4		
Franklin Street & NC 86 (Columbia Street)	AM	C	33.1	C	30.5	C	30.8		
	NOON	D	40.8	D	41.0	D	40.8		
	PM	D	49.8	E	58.7	E	57.8		
E. Franklin Street & Henderson Street	AM	A	7.4	A	7.8	A	8.0		
	NOON	B	12.7	B	12.6	B	12.1		
	PM	B	15.8	B	13.5	B	12.0		
E. Franklin Street & Hillsborough Street / Raleigh Street	AM	C	32.0	C	22.6	C	22.6		
	NOON	C	29.9	C	23.6	C	24.1		
	PM	C	31.9	C	21.6	C	21.3		
NC 86 (MLK Jr. Blvd) & N. Columbia Street / North Street [#]	AM	C	15.1	C	15.7	C	16.2	C	16.6
	NOON	B	14.6	C	15.3	C	15.7	C	17.0
	PM	F	85.5	F	119.6	F	159.1	F	189.5
NC 86 (MLK Jr. Blvd) & Longview Street	AM	A	9.4	A	9.5	A	9.5		
	NOON	A	5.5	A	5.6	A	5.6		
	PM	A	8.0	A	8.1	A	8.1		
W. Cameron Avenue & NC 86 (Pittsboro Street)	AM	C	24.0	B	17.1	B	17.2		
	NOON	C	21.5	B	19.9	C	20.1		
	PM	C	30.8	C	21.0	C	20.4		
Cameron Avenue & NC 86 (S. Columbia Street)	AM	C	32.1	C	27.9	C	28.2		
	NOON	C	33.4	C	32.6	C	33.3		
	PM	D	47.9	D	45.5	D	53.1		
E. Rosemary St & Recommended Parking Deck Primary Driveway [#]	AM	N/A	N/A	N/A	N/A	N/A	N/A	B	14.2
	NOON	N/A	N/A	N/A	N/A	N/A	N/A	C	15.7
	PM	N/A	N/A	N/A	N/A	N/A	N/A	C	15.5
NC 86 (N. Columbia Street) & Proposed Access (Right-Turn Exit Only) [#]	AM	N/A	N/A	N/A	N/A	N/A	N/A	A	9.9
	NOON	N/A	N/A	N/A	N/A	N/A	N/A	B	10.3
	PM	N/A	N/A	N/A	N/A	N/A	N/A	B	12.6

BOLD/ITALICS – Critical Movement or Overall Intersection Requires Mitigation Analysis Per Town TIS Guidelines

[#] - Worst-Case LOS/Delay for Two-Way Unsignalized/Stop-Controlled Critical Movement



Access Analysis

Vehicular site access is to be accommodated in the current site access plan at two proposed parking deck access driveways connecting to E. Rosemary Street. As conceptually shown in **Figure ES-2**, the western driveway access point is approximately 275 feet from the NC 86 (N. Columbia Street) intersection and the eastern driveway access point has approximately 200 feet of separation from the western access point. No specific throat lengths are shown on the concept plan and should be part of the detailed design of the parking deck to provide a 50 foot minimum throat length found on Page 69 of the 2017 *Town of Chapel Hill Public Works Design Manual*. Current schematic drawings indicate that additional throat length may be needed depending on the desired internal circulation pattern and location of entry/exit gates. Driveway distances along E. Rosemary Street from the signalized intersections at NC 86 and Henderson Street are approximately 275 feet from the western driveway and 500 feet from the eastern driveway respectively are meet acceptable NCDOT and Town standards.

Signal Warrant Analysis

Based on projected 2022 traffic volumes and proposed access plans, no unsignalized intersection would warrant the installation of a traffic signal, based on the methodology found in the 2009 *Manual on Uniform Traffic Control Devices (MUTCD)*.

Crash Analysis

Crash analysis of the E. Rosemary Street and NC 86 corridors was compiled from the NCDOT TEAAS software for the last five years and results indicate that both corridors experience crash rates considerably higher than North Carolina statewide averages for similar roadway facilities, with most crashes located near high volume intersections.

Other Transportation-Related Analyses

Other transportation-related analyses relevant to the Town of Chapel Hill Guidelines for the preparation of Traffic Impact Studies were completed as appropriate. The following topics listed in **Table ES-3** are germane to the scope of this study.

Table ES-3. Other Transportation-Related Analyses

Analysis	Comment
Turn Lane Storage Requirements	Storage bay lengths at study area intersections were analyzed using Synchro and HCM 95th percentile (max) queue length estimates for all analyzed scenarios. The original access concept's western access point on E. Rosemary would likely be blocked by westbound queues on E. Rosemary Street at the NC 86 intersection. The modified access scenario removes some site-related traffic from E. Rosemary Street, thus reducing queue lengths. Providing a single access point for the deck farther to the east of the NC 86 intersection provide adequate separation to manage left-turn queues and avoid deck access blockage. There are several intersections in the study area that are currently near capacity and are expected to continue to be in the 2022 analysis year where one or multiple left-turn storage bays do not provide adequate storage to accommodate existing or projected maximum peak hour queues. As roadway capacity improvements in these situations would generally be difficult give current right-of-way constraints in the downtown and UNC Main Campus area, and the fact that the proposed parking deck is expected to marginally contribute to queuing issues beyond the immediate intersections adjacent to the site, no additional recommendations were made for turn lane storage requirements for this study.
Appropriateness of Acceleration / Deceleration Lanes	The site concept plan does not show any provision for additional acceleration or deceleration lanes. With the proposed site located in the downtown Chapel Hill central business district, most area roadways have low posted speeds and do not require additional acceleration / deceleration lanes. E. Rosemary Street has a three-lane cross section with center left-turn lane that will provide separation for turning traffic into the proposed parking deck. The



Analysis	Comment
	modified access scenario also utilizes the center left-turn lane along NC 86 for safe separation of turning traffic onto North Street from the southbound through travel lanes.
Pedestrian and Bicycle Analysis	Existing pedestrian access and connectivity is currently well implemented throughout downtown Chapel Hill that would be served by the proposed deck. Consideration should be made to provide a pedestrian overpass connection to development south of E. Rosemary Street adjacent to the proposed deck. A mid-block delineated pedestrian crossing with raised central median on E. Rosemary Street would also reduce likelihood of jay-walking from the deck to the south side of the street. Bicycle facilities (bike lanes and roadway "sharrows" and activity are prevalent in the downtown area as well and the proposed deck design could incorporate opportunities for bicycle parking convenient to E. Rosemary Street frontage.

Mitigation Measures/Recommendations

Planned Improvements

There are no planned transportation improvement projects by NCDOT expected to be complete between 2020 and 2022 in the immediate project study area. The Town of Chapel Hill is in the process of designing and implementing the West Franklin Street Lane Reallocation project to reduce the number of through travel lanes on West Franklin Street west of NC 86. This project was expected to be complete by the 2022 analysis year and was also assumed to include signal retiming throughout the downtown area to account for vehicular flow changes in the lane reallocation vicinity. Details are shown on **Figure ES-3**.

The Town also has the North-South Bus Rapid Transit Project, which will provide dedicated lanes for transit along the NC 86 corridor, along with other transit amenity improvements scheduled for construction in 2022. As final design details are not complete as of the submittal of this TIS, no specific lane usage changes were analyzed as part of this study.

Background Committed Improvements

There are no specific transportation improvements to study area roadway intersections related to background private development projects that are expected to be completed between 2020 and 2022.

Applicant Committed Improvements

Based on the preliminary site concept plans and supporting development information provided, there are no specific transportation-related improvements proposed external to the East Rosemary Parking Deck site. The current plan and preliminary deck design incorporates two full movement access points along E. Rosemary Street only, with single lane entry/exits.

Necessary Improvements

Based on traffic capacity analyses for the 2022 design year, and analyses of existing study area turning bay storage lengths and site access, the following improvements are recommended as being necessary for adequate transportation network operations (see **Figure ES-3A**).

- 1) To reduce potential conflicts and provide better separation for left-turning vehicles along E. Rosemary Street approaching the NC 86 intersection westbound and the parking deck eastbound, eliminate the currently proposed western deck access location and provide a single primary deck access location where the current eastern deck access is proposed. At this primary access point, provide separate left-turn and right-turn exit lanes. Depending on method of parking deck space management (gates/ticketing), provide adequate internal queue storage for entry flows that may reach 200 vehicles in a single hour. This improvement is recommended for the East Rosemary Parking Deck development.



- 2) Due to potential peak hour queuing issues for the westbound left-turn and through travel lanes at the E. Rosemary Street intersection with NC 86 (N. Columbia Street), reoptimize the traffic signal timings to allow adequate green time to reduce westbound queuing for this movement in all peak hours. This improvement is recommended for the East Rosemary Parking Deck development.
- 3) To reduce site-related traffic volumes at the critical E. Rosemary Street intersection with NC 86, provide alternate access using North Street to a one-way inbound parking deck connection and a one-way outbound parking deck connection with N. Columbia Street. This should remove most parking deck related traffic flow to/from the NC 86 corridor without adding site-related traffic that may cut-through the North Street neighborhood (it is was allowed an exiting connection) and reduce queue blockage issues, sight distance issues, and vehicular conflicts if the N. Columbia Street access were allowed an inbound entry access lane. The proposed exit-only access at this location should also be restricted to right-turn out only. Further design investigation will be required to assess impacts to existing private surface parking lots and access points along N. Columbia Street and North Street. These improvements are recommended for the East Rosemary Parking Deck development.
- 4) Additional wayfinding signage on external roadways and internal to the proposed parking deck is recommended to fully utilize the proposed North Street and N. Columbia Street access points, as well as identify routes to E. Franklin Street, US 15-501, and NC 54 (make a left-turn exiting the deck) and NC 86 South, Carrboro, Pittsboro (make a right-turn exiting the deck). These improvements are recommended for the East Rosemary Parking Deck development.
- 5) To provide direct, safe, and convenient pedestrian access from the parking deck to commercial developments south of the E. Rosemary Street corridor, it is recommended that a pedestrian overpass be included in the deck design, similar to the existing pedestrian overpass that connects the existing Rosemary Parking Deck. In addition, at street level, a mid-block pedestrian crosswalk, with appropriate signage and potentially a raised median refuge island depending on its location should be included. These improvements are recommended for the East Rosemary Parking Deck development.

DRAFT

NOT
TO
SCALE

LEGEND

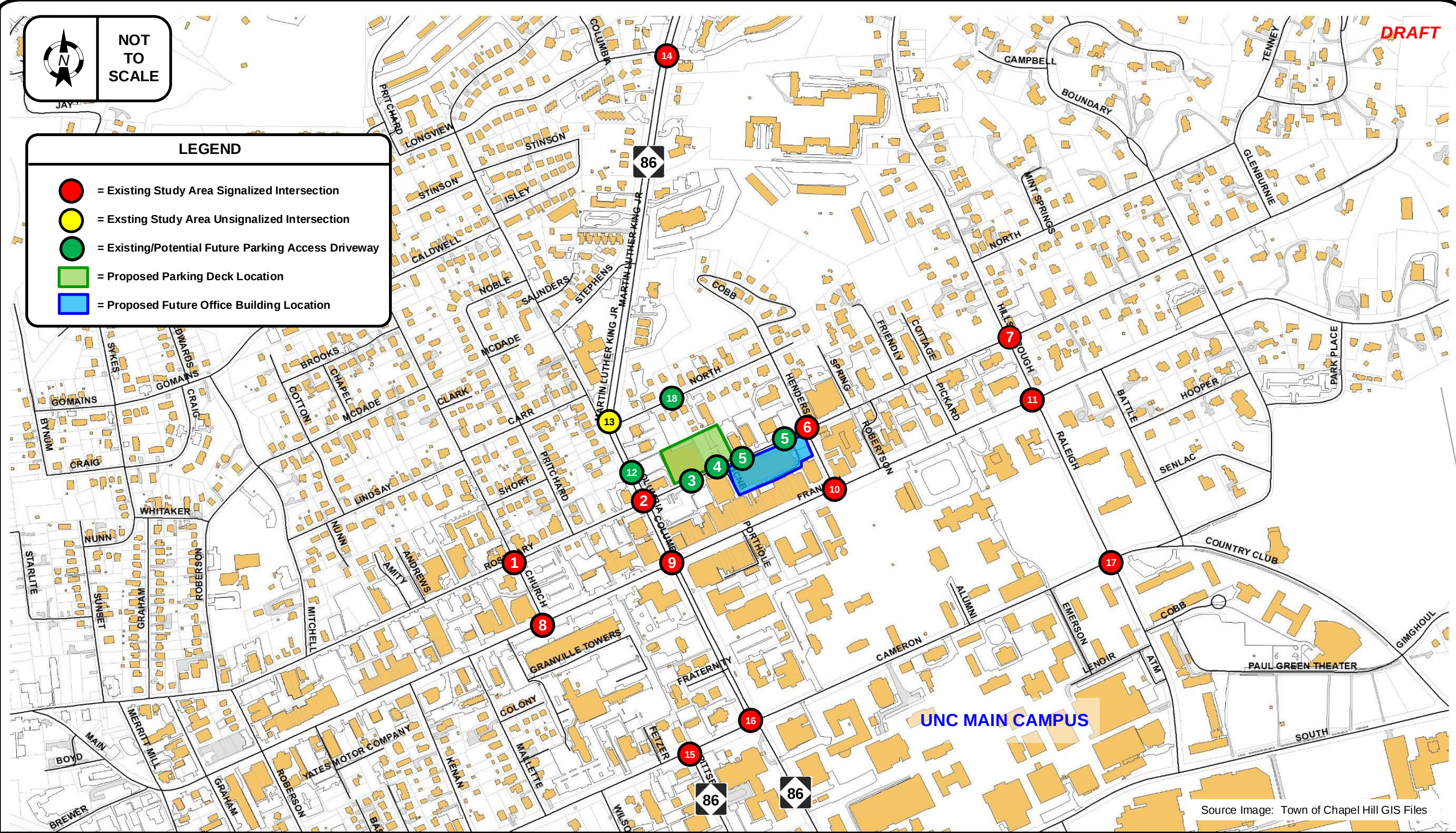
= Existing Study Area Signalized Intersection

= Existing Study Area Unsignalized Intersection

= Existing/Potential Future Parking Access Driveway

= Proposed Parking Deck Location

= Proposed Future Office Building Location



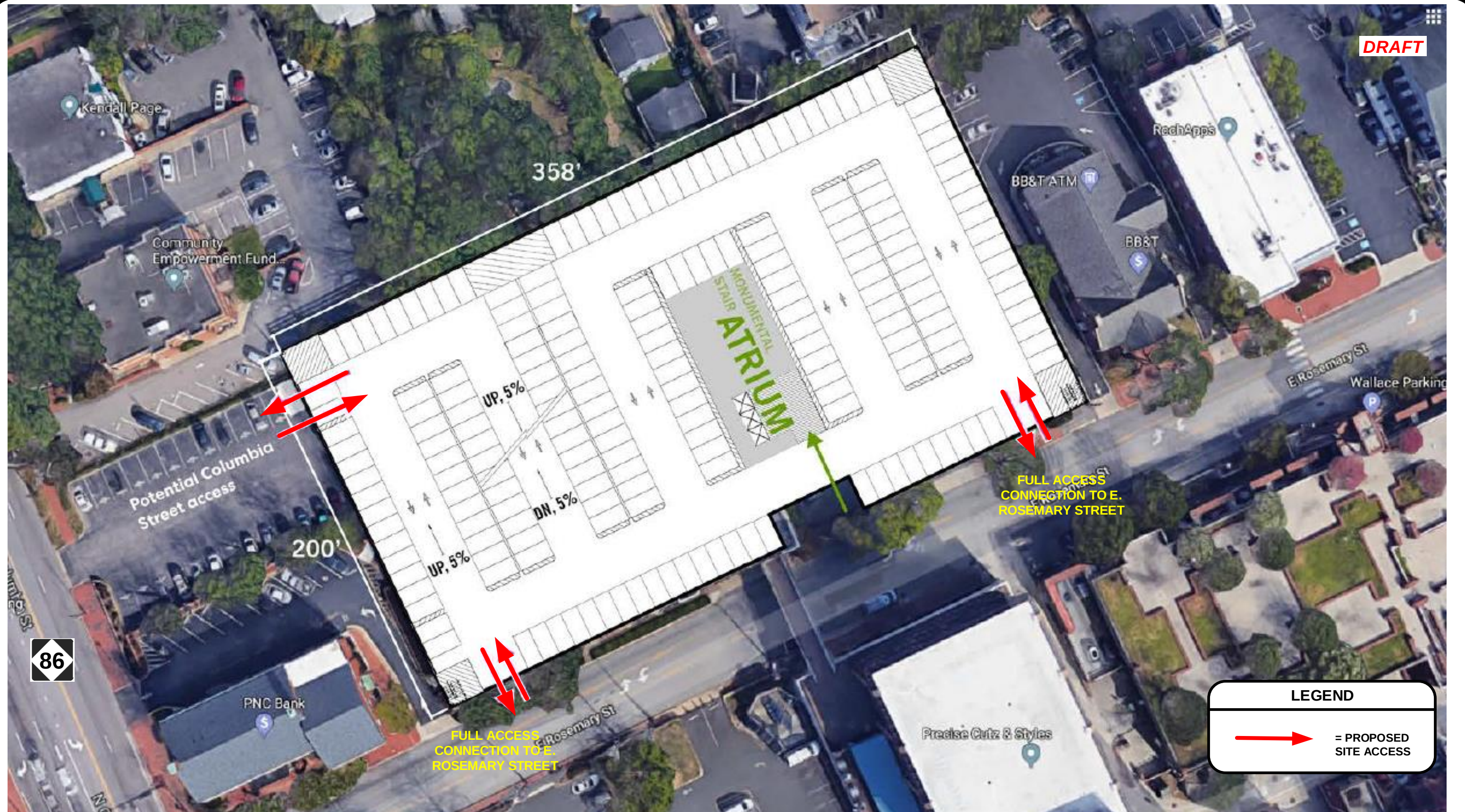
East Rosemary Street Parking Deck
Traffic Impact Study

PROJECT STUDY AREA

DATE: April 2020

FIGURE ES-1

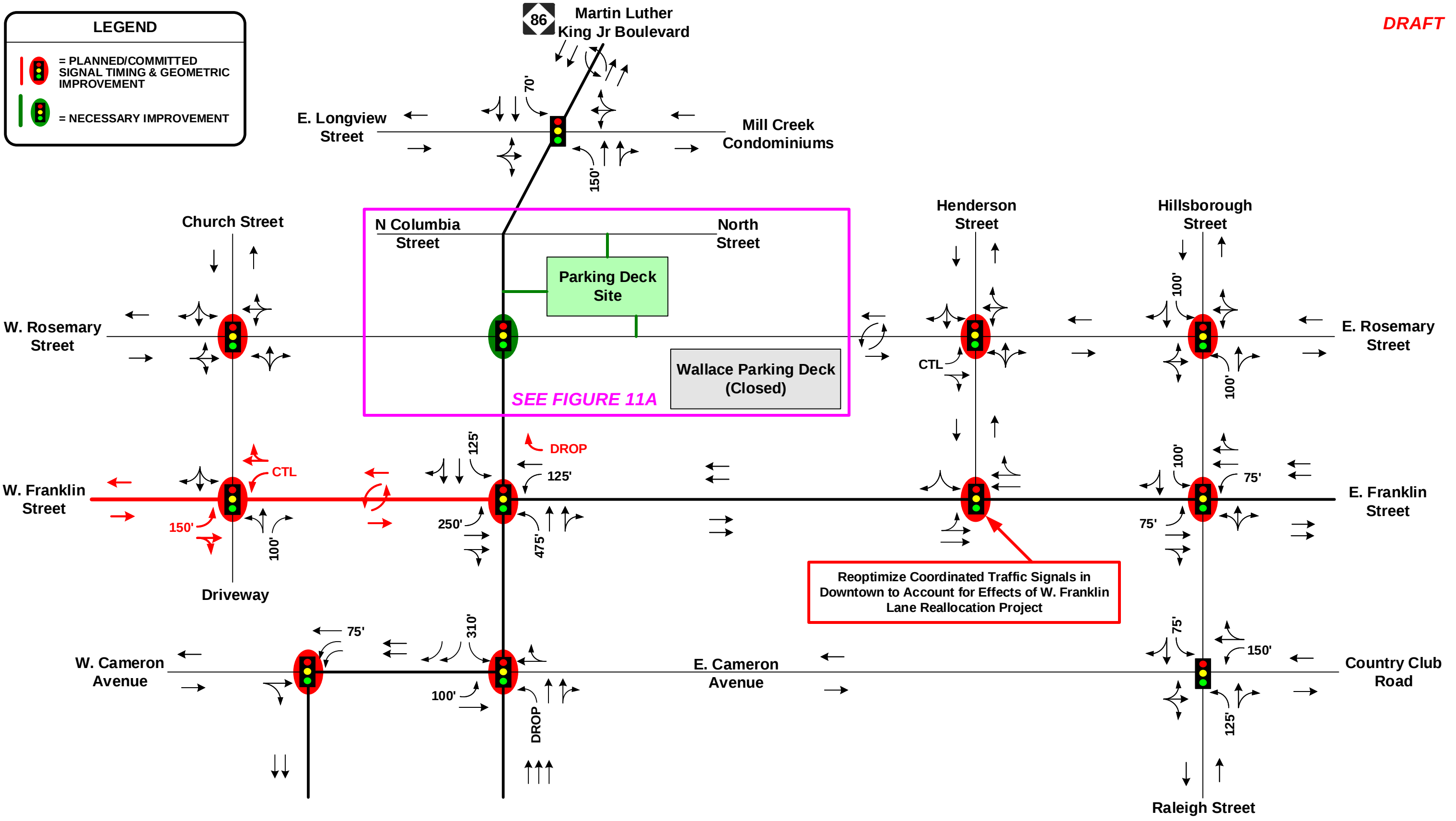
Source Image: Town of Chapel Hill GIS Files



LEGEND

= PLANNED/COMMITTED
SIGNAL TIMING & GEOMETRIC
IMPROVEMENT

= NECESSARY IMPROVEMENT



**DECK ENTRY ONLY – LOCATION TBD
NORTH STREET REMAINS TWO-WAY
STREET**

**PROVIDE WAY-FINDING
SIGNAGE FOR
DECK ENTRY**

**DECK EXIT ONLY –
LOCATION TBD
ADDITIONAL DESIGN
NEEDED TO ADDRESS
EXISTING SURFACE
PARKING LOT
CIRCULATION AND
ACCESS**

**SINGLE FULL ACCESS ON E. ROSEMARY
PROPOSED ONE ENTRY/TWO EXIT LANES**

**PROVIDE PEDESTRIAN
OVERPASS AND ON-
STREET MID-BLOCK
PED CROSSING**

**RETIME SIGNAL TO
PREVENT WESTBOUND
QUEUE SPILLBACK
BEYOND DECK
ACCESS LOCATION**

DRAFT

N. COLUMBIA STREET

NORTH STREET

E. ROSEMARY STREET

HENDERSON STREET

MONUMENTAL STAIR ATRIUM

UP, 5%

DN, 5%

UP, 5%

200'

358'

Potential Columbia Street access

PNC Bank

BB&T ATM

Reich Apps

Wallace Parking

86

Google Earth